Airport Pavement R&D Section

ANG-E262

Presented to: REDAC

By: ANG-E262

Date: March 4, 2020

Federal Aviation Administration

Outline

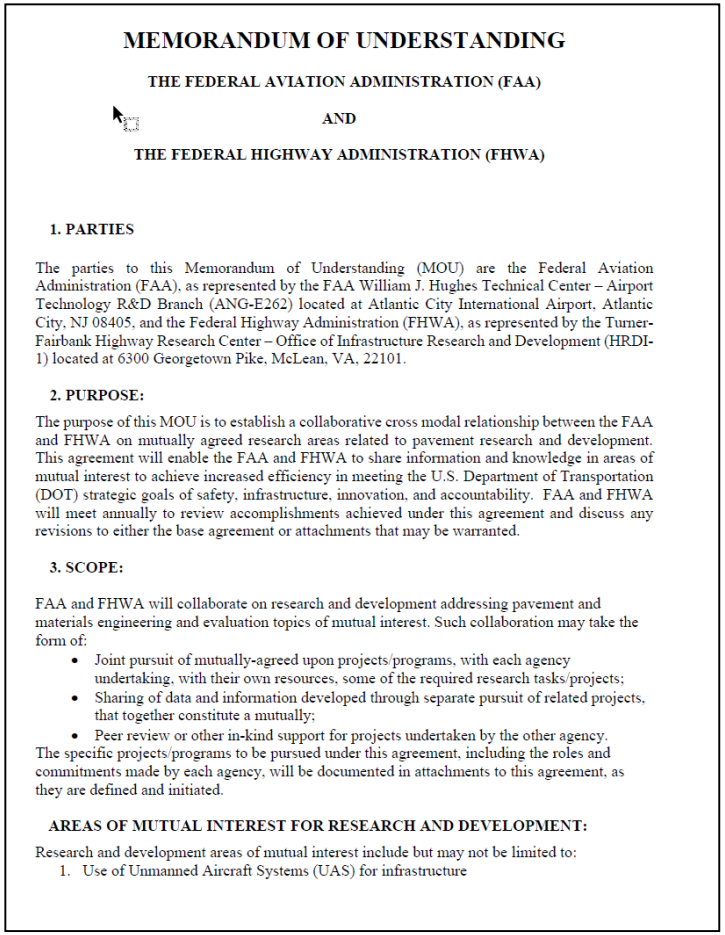
- **New Contract**
- **National/ International Agreements**
- **Pavement RPAs**
- **FAA Reauthorization Act of 2018 – Sections**
- **FY 2020 Appropriations**
  - Pavement Technology Program
- **Research Requests**

New Contract

- **Industry Day: December 3, 2019**
- **Approx. 250 attendees**
- **Contract Opportunities**
  - Operation & Maintenace of Facilities
  - Pavement Materials Laboratory
  - Pavement Consultants
  - Qualified Vendors List (QVL) for paving contractors
  - Broad Area Announcements (BAA)

National / International Agreements

- **MOU with Federal Highway Administration (FHWA)**
- **SIGNED: July 29, 2019**



MEMORANDUM OF UNDERSTANDING

THE FEDERAL AVIATION ADMINISTRATION (FAA)

AND

THE FEDERAL HIGHWAY ADMINISTRATION (FHWA)

1. PARTIES

The parties to this Memorandum of Understanding (MOU) are the Federal Aviation Administration (FAA), as represented by the FAA William J. Hughes Technical Center – Airport Technology R&D Branch (ANG-E262) located at Atlantic City International Airport, Atlantic City, NJ 08405, and the Federal Highway Administration (FHWA), as represented by the Turner-Fairbank Highway Research Center – Office of Infrastructure Research and Development (HRDI-1) located at 6300 Georgetown Pike, McLean, VA, 22101.

2. PURPOSE:

The purpose of this MOU is to establish a collaborative cross modal relationship between the FAA and FHWA on mutually agreed research areas related to pavement research and development. This agreement will enable the FAA and FHWA to share information and knowledge in areas of mutual interest to achieve increased efficiency in meeting the U.S. Department of Transportation (DOT) strategic goals of safety, infrastructure, innovation, and accountability. FAA and FHWA will meet annually to review accomplishments achieved under this agreement and discuss any revisions to either the base agreement or attachments that may be warranted.

3. SCOPE:

FAA and FHWA will collaborate on research and development addressing pavement and materials engineering and evaluation topics of mutual interest. Such collaboration may take the form of:

- Joint pursuit of mutually-agreed upon projects/programs, with each agency undertaking, with their own resources, some of the required research tasks/projects;
- Sharing of data and information developed through separate pursuit of related projects, that together constitute a mutually;
- Peer review or other in-kind support for projects undertaken by the other agency.

The specific projects/programs to be pursued under this agreement, including the roles and commitments made by each agency, will be documented in attachments to this agreement, as they are defined and initiated.

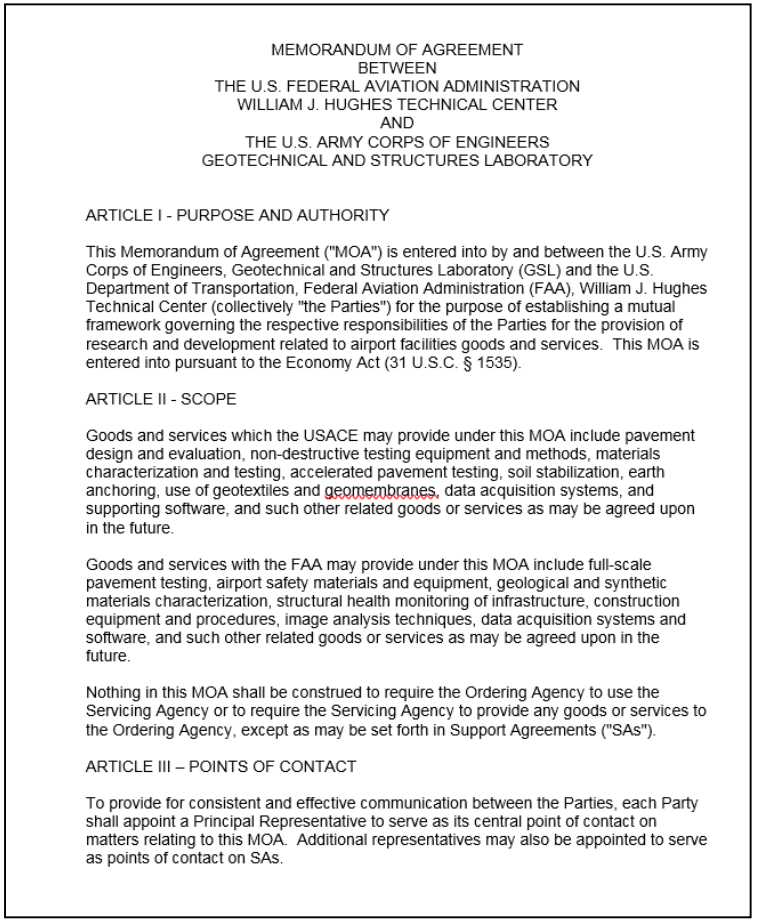
AREAS OF MUTUAL INTEREST FOR RESEARCH AND DEVELOPMENT:

Research and development areas of mutual interest include but may not be limited to:

1. Use of Unmanned Aircraft Systems (UAS) for infrastructure

National/International Agreements

- **MOA with U.S. Army Corps of Engineers**
  - Geotechnical and Structures Laboratory
- **SIGNED: Sept 26, 2019**



MEMORANDUM OF AGREEMENT
BETWEEN
THE U.S. FEDERAL AVIATION ADMINISTRATION
WILLIAM J. HUGHES TECHNICAL CENTER
AND
THE U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL AND STRUCTURES LABORATORY

ARTICLE I - PURPOSE AND AUTHORITY

This Memorandum of Agreement ("MOA") is entered into by and between the U.S. Army Corps of Engineers, Geotechnical and Structures Laboratory (GSL) and the U.S. Department of Transportation, Federal Aviation Administration (FAA), William J. Hughes Technical Center (collectively "the Parties") for the purpose of establishing a mutual framework governing the respective responsibilities of the Parties for the provision of research and development related to airport facilities goods and services. This MOA is entered into pursuant to the Economy Act (31 U.S.C. § 1535).

ARTICLE II - SCOPE

Goods and services which the USACE may provide under this MOA include pavement design and evaluation, non-destructive testing equipment and methods, materials characterization and testing, accelerated pavement testing, soil stabilization, earth anchoring, use of geotextiles and geomembranes, data acquisition systems, and supporting software, and such other related goods or services as may be agreed upon in the future.

Goods and services with the FAA may provide under this MOA include full-scale pavement testing, airport safety materials and equipment, geological and synthetic materials characterization, structural health monitoring of infrastructure, construction equipment and procedures, image analysis techniques, data acquisition systems and software, and such other related goods or services as may be agreed upon in the future.

Nothing in this MOA shall be construed to require the Ordering Agency to use the Servicing Agency or to require the Servicing Agency to provide any goods or services to the Ordering Agency, except as may be set forth in Support Agreements ("SAs").

ARTICLE III – POINTS OF CONTACT

To provide for consistent and effective communication between the Parties, each Party shall appoint a Principal Representative to serve as its central point of contact on matters relating to this MOA. Additional representatives may also be appointed to serve as points of contact on SAs.

National/International Agreements – In process

- **Ente Nazionale Per L'Aviazione Civile (ENAC)**
  - **Memorandum of Cooperation (MOC)** under review by the State Department
- **Council for Scientific and Industrial Research (CSIR)**
  - **Cooperative Research and Development Agreement (CRDA)**
    - Reviewed, returned with comments from CSIR under final legal review process at FAA International Office
- **Korea Airports Corporation (KAC)**
  - **Cooperative Research and Development Agreement (CRDA)** under legal review process at FAA International Office
- **Fraport Greece**
  - **Cooperative Research and Development Agreement (CRDA)** under legal review of Fraport-Greece & Greek government

Pavement RPAs

P1: NATIONAL AIRPORT PAVEMENT TEST FACILITY (NAPTF)
- P1.1: Pavement Construction
- P1.2: Facility Operation
- P1.3: Facility Maintenance

P2: NATIONAL AIRPORT PAVEMENT AND MATERIALS RESEARCH CENTER (NAPMRC)
- P2.1: Pavement Construction
- P2.2: Facility Operation
- P2.3: Facility Maintenance
- P2.4: HVS-A Maintenance & Repair
- P2.5: HVS-A Operation

P3: FIELD INSTRMENTATION & TESTING

P4: ADVANCED MATERIALS
- P4.1: Heated Pavements
- P4.2: Geosynthetics
- P4.3: Advanced Testing
- P4.4: Operation of NextGen Pavement Materials Lab

P5: PAVEMENT DESIGN AND EVALUATION
- P5.1: Design Improvements
- P5.2: ACN/PCN Improvements
- P5.3: Analysis

P6: NDT TECHNOLOGY
- P6.1: Non-Falling Weight NDT Technology
- P6.2: Pavement Evaluation
- P6.3: Pavement Roughness and Surface Characteristics Research
- P6.4: Remaining Airport Pavement Life

P7: SOFTWARE PROGRAM DEVELOPMENT & SUPPORT
- P7.1: FAA PAVEAIR Development and Maintenance
- P7.2: Software Integration
- P7.3: Branch Website Development and Maintenance

P8: EXTENDED PAVEMENT LIFE

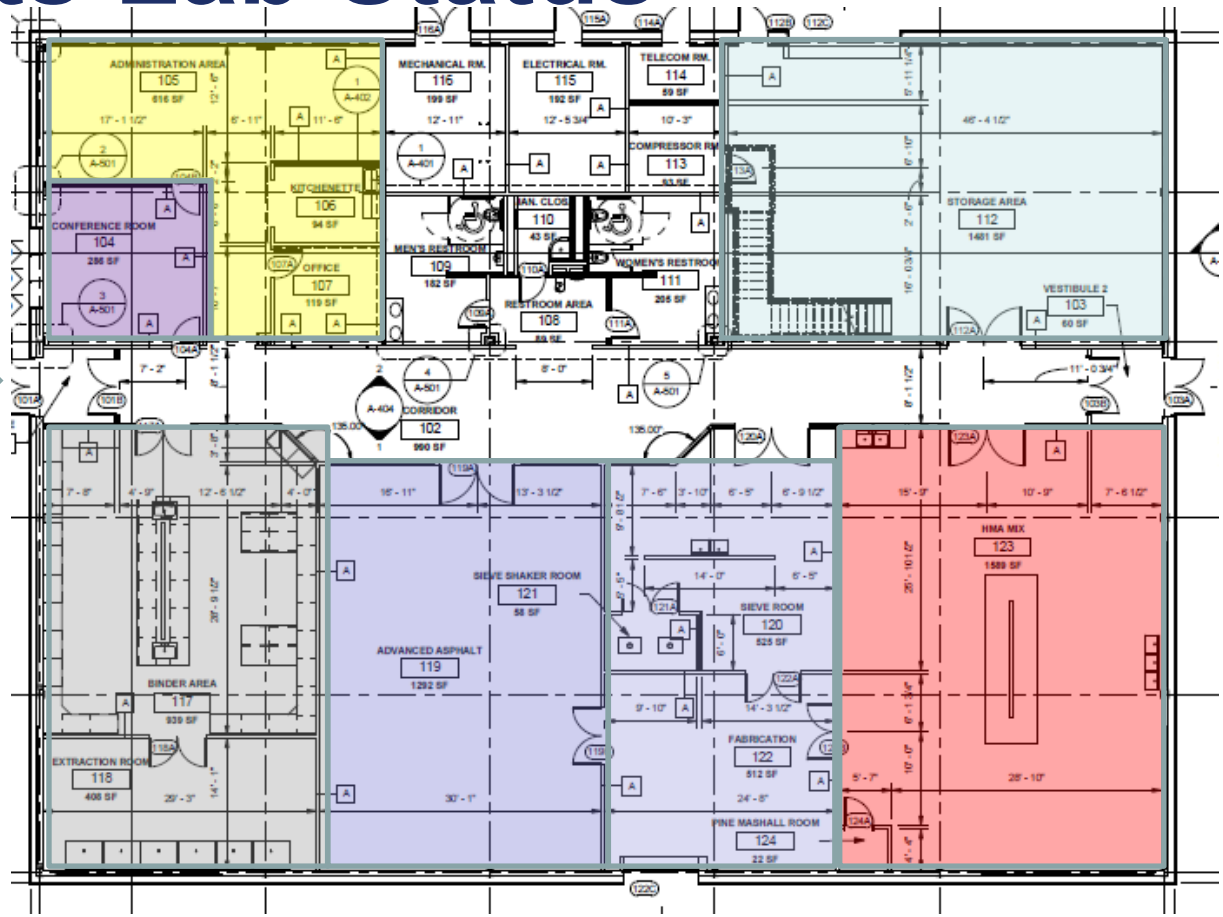
Pavements Lab Status

- 90% Submission delivered December 2019
- Chief Financial Officer Approval Received
- Funds added in FY 2019
- Funds to be added in FY 2020
- Construction – Starting Fall of 2020

Pavements Lab Status

Pavements Lab Status

Entrance



- Conference Rm
- Admin Area
- Storage
- Binder Lab
- Advances Asphalt Testing
- Sieve / Fabrication Area
- HMA mix Lab

FAA Reauthorization Act of 2018

SEC. 525. GEOSYNTHETIC MATERIALS.

The Administrator, to the extent practicable, shall encourage the use of durable, resilient, and sustainable materials and practices, including the use of geosynthetic materials and other innovative technologies, in carrying out the activities of the Federal Aviation Administration.

FAA Reauthorization Act of 2018

SEC. 744. RESEARCH AND DEPLOYMENT OF CERTAIN AIRFIELD PAVEMENT TECHNOLOGIES.

Using amounts made available under section 48102(a) of title 49, United States Code, the Administrator of the Federal Aviation Administration may carry out a program for the research and development of aircraft pavement technologies under which the Administrator makes grants to, and enters into cooperative agreements with, institutions of higher education and nonprofit organizations that—

(1) research concrete and asphalt airfield pavement technologies that extend the life of airfield pavements;

(2) develop and conduct training;

(3) provide for demonstration projects; and

(4) promote the latest airfield pavement technologies to aid in the development of safer, more cost effective, and more durable airfield pavements.

FY 2020 Appropriations

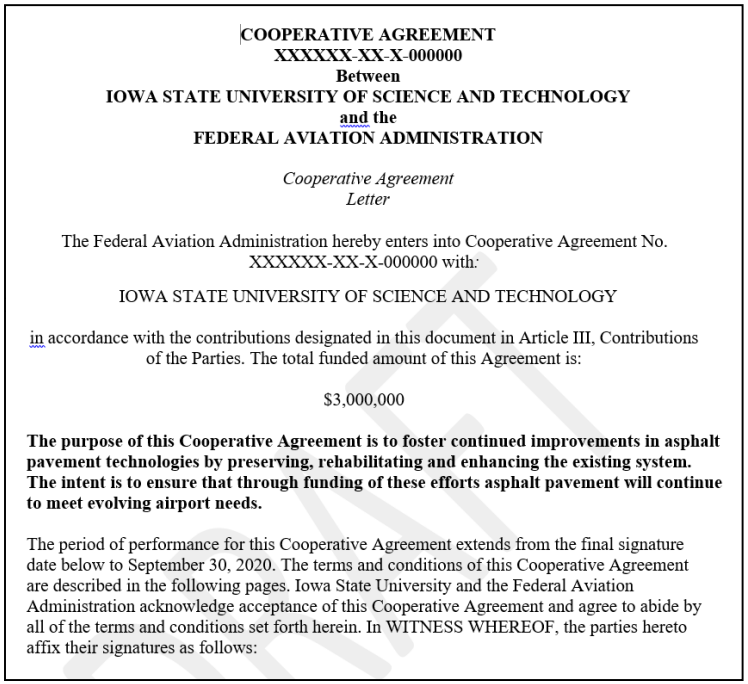
Directive Topics	Synopsis	Legislative Source	Deadline	LOB Responsible	Status	Comments
Airport technology research	Not less than $39,224,000 shall be available for Airport Technology Research	Conference Bill H.R. 1865 (p. 409)	N/A	ARP		
	The Committee recommendation includes a minimum of $33,210,000 for the FAA's airport technology research program to conduct research on topics such as concrete and asphalt airport pavement in accordance with section 744 of the FAA Reauthorization Act (P.L. 115–254); airport marking and lighting; airport rescue and firefighting; airport planning and design; wildlife hazard mitigation; and visual guidance.	House Report 116-106 (p.28)				
	The Committee recommends $39,224,000 for Airport Technology Research. Of this amount, $6,000,000 is for the airfield pavement technology program authorized under section 744 of Public Law 115–254, of which $3,000,000 is for concrete pavement research and $3,000,000 is for asphalt pavement research.	Senate Report 116-109 (p.43)				

Pavement Technology Program

- **Modeling the old Airport Concrete and Asphalt Pavement Technology Programs (ACPTP & AAPTP)**
  - ACPTP managed by Innovative Pavement Research Foundation (IPRF)
  - AAPTP managed by Auburn University
  - Funding started back in 2001
  - FAA Grants program

Pavement Technology Program

- **American Concrete Pavement Association (ACPA)**
  - Iowa State University of Science and technology
    - National Concrete Pavement Technology Center



COOPERATIVE AGREEMENT
XXXXXX-XX-X-000000
Between
IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY
and the
FEDERAL AVIATION ADMINISTRATION

Cooperative Agreement
Letter

The Federal Aviation Administration hereby enters into Cooperative Agreement No. XXXXXX-XX-X-000000 with:

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY

in accordance with the contributions designated in this document in Article III, Contributions of the Parties. The total funded amount of this Agreement is:

$3,000,000

The purpose of this Cooperative Agreement is to foster continued improvements in asphalt pavement technologies by preserving, rehabilitating and enhancing the existing system. The intent is to ensure that through funding of these efforts asphalt pavement will continue to meet evolving airport needs.

The period of performance for this Cooperative Agreement extends from the final signature date below to September 30, 2020. The terms and conditions of this Cooperative Agreement are described in the following pages. Iowa State University and the Federal Aviation Administration acknowledge acceptance of this Cooperative Agreement and agree to abide by all of the terms and conditions set forth herein. In WITNESS WHEREOF, the parties hereto affix their signatures as follows:

Pavement Technology Program

- **National Asphalt Pavement Association (NAPA)**

COOPERATIVE AGREEMENT
XXXXXX-XX-X-000000
Between
NATIONAL ASPHALT PAVEMENT ASSOCIATION and the
FEDERAL AVIATION ADMINISTRATION

Cooperative Agreement
Letter

The Federal Aviation Administration hereby enters into Cooperative Agreement No. XXXXXX-XX-X-000000 with:

NATIONAL ASPHALT PAVEMENTASSOCIATION

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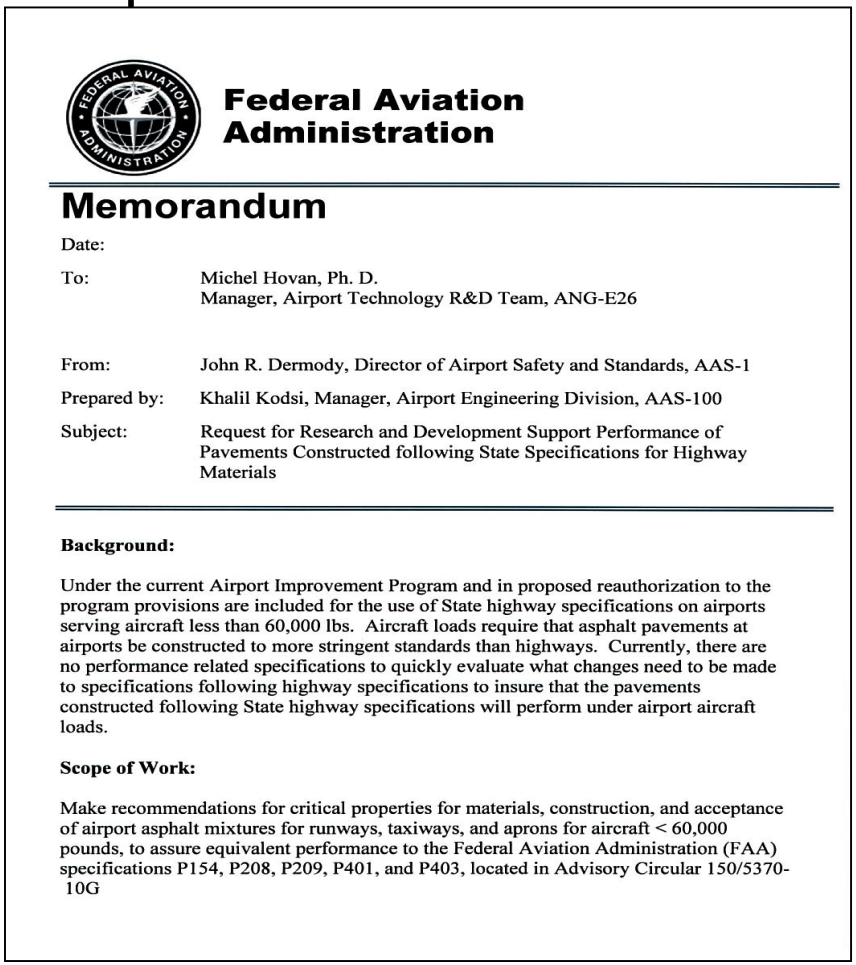
Research Requests

1. Performance tests for asphalt pavements – State Specifications
   Date: Aug 13, 2018



Federal Aviation Administration

Memorandum

Date:

To: Michel Hovan, Ph. D.
Manager, Airport Technology R&D Team, ANG-E26

From: John R. Dermody, Director of Airport Safety and Standards, AAS-1

Prepared by: Khalil Kodsi, Manager, Airport Engineering Division, AAS-100

Subject: Request for Research and Development Support Performance of Pavements Constructed following State Specifications for Highway Materials

Background:

Under the current Airport Improvement Program and in proposed reauthorization to the program provisions are included for the use of State highway specifications on airports serving aircraft less than 60,000 lbs. Aircraft loads require that asphalt pavements at airports be constructed to more stringent standards than highways. Currently, there are no performance related specifications to quickly evaluate what changes need to be made to specifications following highway specifications to insure that the pavements constructed following State highway specifications will perform under airport aircraft loads.

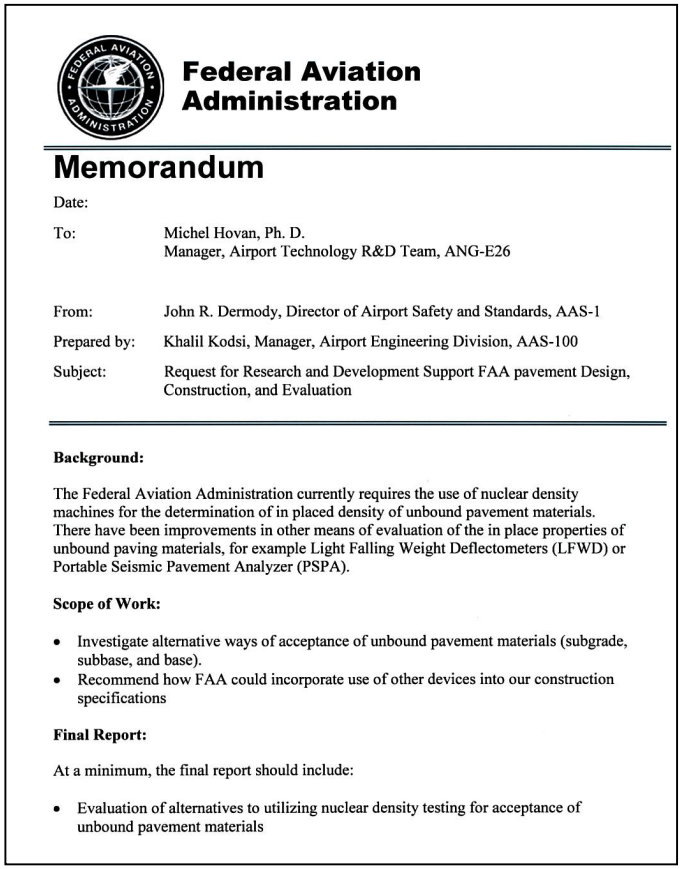
Scope of Work:

Make recommendations for critical properties for materials, construction, and acceptance of airport asphalt mixtures for runways, taxiways, and aprons for aircraft < 60,000 pounds, to assure equivalent performance to the Federal Aviation Administration (FAA) specifications P154, P208, P209, P401, and P403, located in Advisory Circular 150/5370-10G

Research Requests

2. Alternate methods of acceptance of unbound materials

Date: Aug 13, 2018



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From: John R. Dermody, Director of Airport Safety and Standards, AAS-1

Prepared by: Khalil Kodsi, Manager, Airport Engineering Division, AAS-100

Subject: Request for Research and Development Support FAA pavement Design, Construction, and Evaluation

Background:

The Federal Aviation Administration currently requires the use of nuclear density machines for the determination of in placed density of unbound pavement materials. There have been improvements in other means of evaluation of the in place properties of unbound paving materials, for example Light Falling Weight Deflectometers (LFWD) or Portable Seismic Pavement Analyzer (PSPA).

Scope of Work:

- Investigate alternative ways of acceptance of unbound pavement materials (subgrade, subbase, and base).
- Recommend how FAA could incorporate use of other devices into our construction specifications

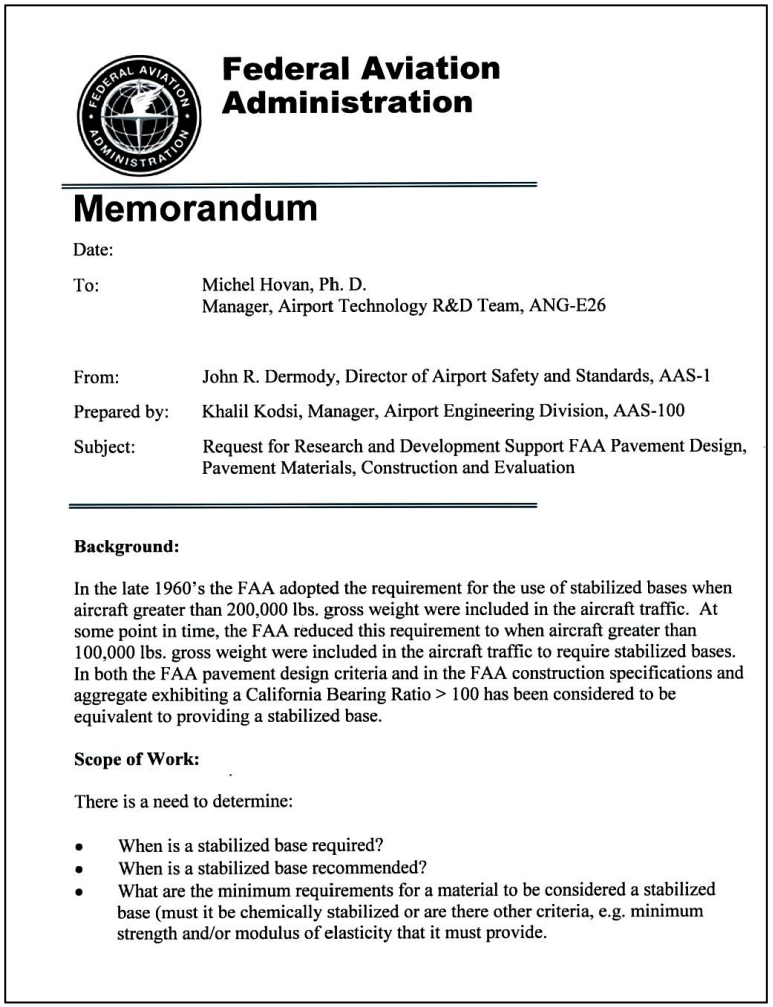
Final Report:

At a minimum, the final report should include:

- Evaluation of alternatives to utilizing nuclear density testing for acceptance of unbound pavement materials

Research Requests

3. Stabilized Bases
Date: Aug 13, 2018



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Manager, Airport Technology R&D Team, ANG-E26

From: John R. Dermody, Director of Airport Safety and Standards, AAS-1

Prepared by: Khalil Kodsi, Manager, Airport Engineering Division, AAS-100

Subject: Request for Research and Development Support FAA Pavement Design, Pavement Materials, Construction and Evaluation

Background:

In the late 1960's the FAA adopted the requirement for the use of stabilized bases when aircraft greater than 200,000 lbs. gross weight were included in the aircraft traffic. At some point in time, the FAA reduced this requirement to when aircraft greater than 100,000 lbs. gross weight were included in the aircraft traffic to require stabilized bases. In both the FAA pavement design criteria and in the FAA construction specifications and aggregate exhibiting a California Bearing Ratio > 100 has been considered to be equivalent to providing a stabilized base.

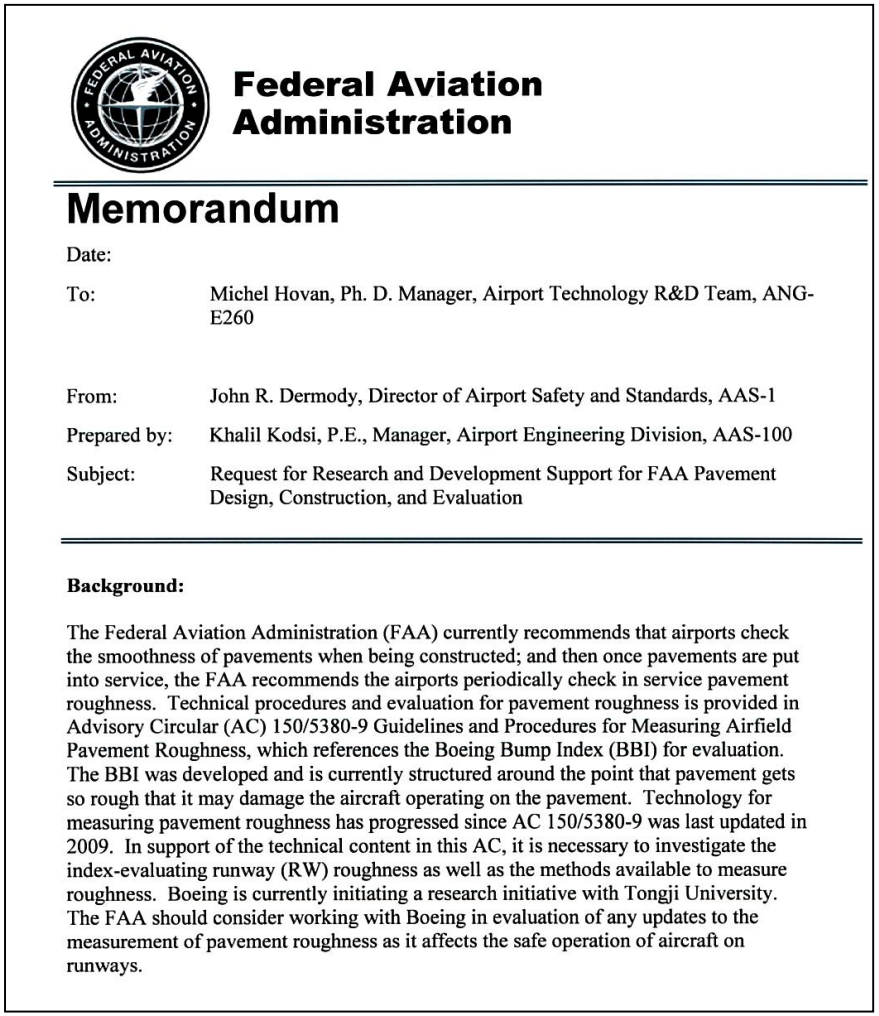
Scope of Work:

There is a need to determine:

- When is a stabilized base required?
- When is a stabilized base recommended?
- What are the minimum requirements for a material to be considered a stabilized base (must it be chemically stabilized or are there other criteria, e.g. minimum strength and/or modulus of elasticity that it must provide.

Research Requests

4. Pavement Roughness
   Date: Aug 13, 2018



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Date:

To: Michel Hovan, Ph. D. Manager, Airport Technology R&D Team, ANG-E260

From: John R. Dermody, Director of Airport Safety and Standards, AAS-1

Prepared by: Khalil Kodsi, P.E., Manager, Airport Engineering Division, AAS-100

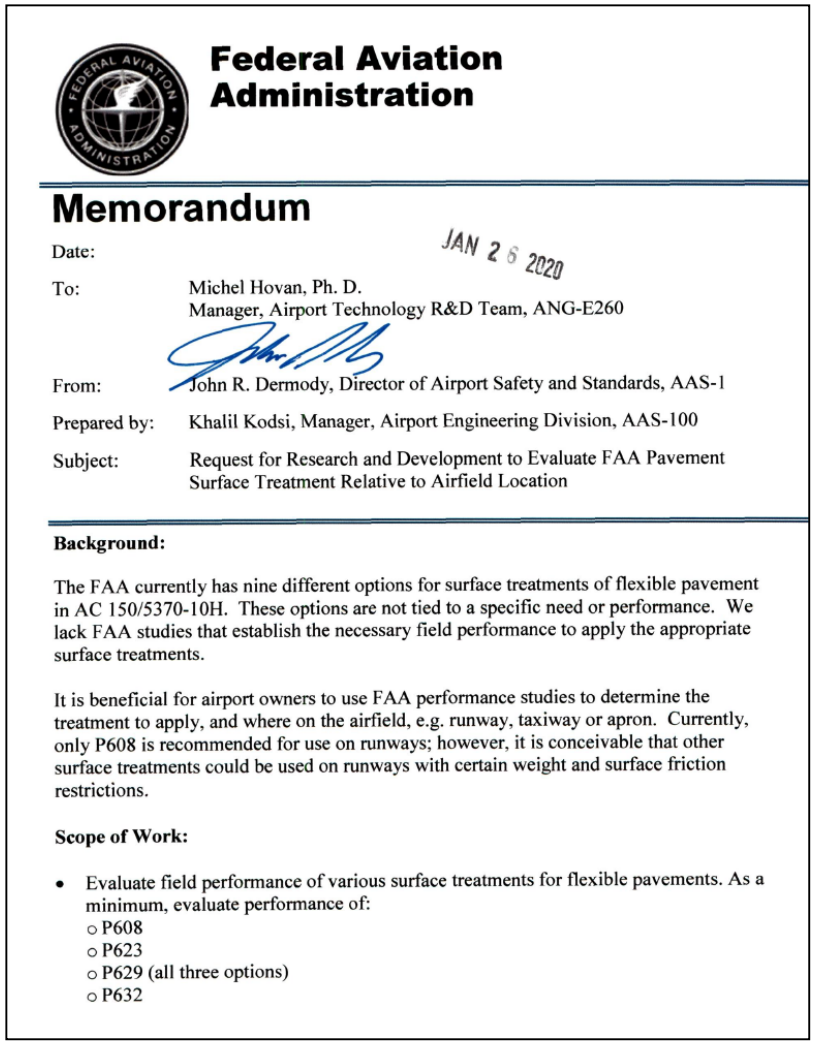
Subject: Request for Research and Development Support for FAA Pavement Design, Construction, and Evaluation

Background:

The Federal Aviation Administration (FAA) currently recommends that airports check the smoothness of pavements when being constructed; and then once pavements are put into service, the FAA recommends the airports periodically check in service pavement roughness. Technical procedures and evaluation for pavement roughness is provided in Advisory Circular (AC) 150/5380-9 Guidelines and Procedures for Measuring Airfield Pavement Roughness, which references the Boeing Bump Index (BBI) for evaluation. The BBI was developed and is currently structured around the point that pavement gets so rough that it may damage the aircraft operating on the pavement. Technology for measuring pavement roughness has progressed since AC 150/5380-9 was last updated in 2009. In support of the technical content in this AC, it is necessary to investigate the index-evaluating runway (RW) roughness as well as the methods available to measure roughness. Boeing is currently initiating a research initiative with Tongji University. The FAA should consider working with Boeing in evaluation of any updates to the measurement of pavement roughness as it affects the safe operation of aircraft on runways.

Research Requests

5. Surface Treatments
   Date: Jan 26, 2020



Federal Aviation Administration

Memorandum

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From: John R. Dermody, Director of Airport Safety and Standards, AAS-1

Prepared by: Khalil Kodsi, Manager, Airport Engineering Division, AAS-100

Subject: Request for Research and Development to Evaluate FAA Pavement Surface Treatment Relative to Airfield Location

Background:

The FAA currently has nine different options for surface treatments of flexible pavement in AC 150/5370-10H. These options are not tied to a specific need or performance. We lack FAA studies that establish the necessary field performance to apply the appropriate surface treatments.

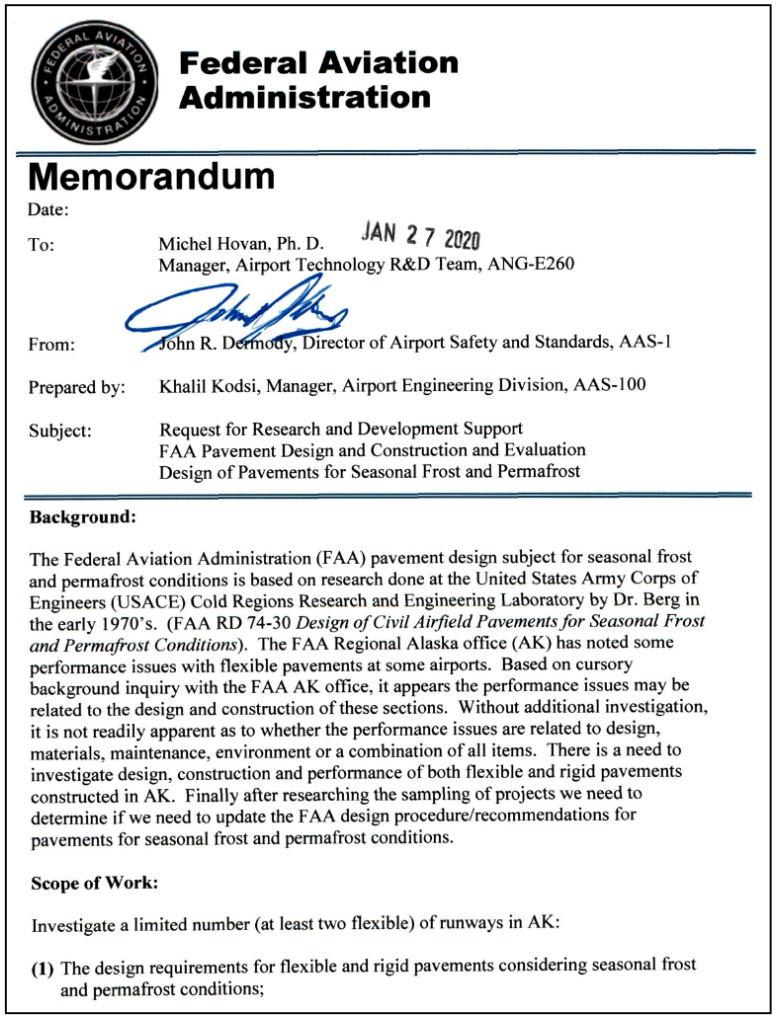
It is beneficial for airport owners to use FAA performance studies to determine the treatment to apply, and where on the airfield, e.g. runway, taxiway or apron. Currently, only P608 is recommended for use on runways; however, it is conceivable that other surface treatments could be used on runways with certain weight and surface friction restrictions.

Scope of Work:

- Evaluate field performance of various surface treatments for flexible pavements. As a minimum, evaluate performance of:
  - P608
  - P623
  - P629 (all three options)
  - P632

Research Requests

6. Seasonal Frost and Permafrost
Date: Jan 27, 2020



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From: John R. Dermody, Director of Airport Safety and Standards, AAS-1

Prepared by: Khalil Kodsi, Manager, Airport Engineering Division, AAS-100

Subject: Request for Research and Development Support
FAA Pavement Design and Construction and Evaluation
Design of Pavements for Seasonal Frost and Permafrost

Background:

The Federal Aviation Administration (FAA) pavement design subject for seasonal frost and permafrost conditions is based on research done at the United States Army Corps of Engineers (USACE) Cold Regions Research and Engineering Laboratory by Dr. Berg in the early 1970's. (FAA RD 74-30 *Design of Civil Airfield Pavements for Seasonal Frost and Permafrost Conditions*). The FAA Regional Alaska office (AK) has noted some performance issues with flexible pavements at some airports. Based on cursory background inquiry with the FAA AK office, it appears the performance issues may be related to the design and construction of these sections. Without additional investigation, it is not readily apparent as to whether the performance issues are related to design, materials, maintenance, environment or a combination of all items. There is a need to investigate design, construction and performance of both flexible and rigid pavements constructed in AK. Finally after researching the sampling of projects we need to determine if we need to update the FAA design procedure/recommendations for pavements for seasonal frost and permafrost conditions.

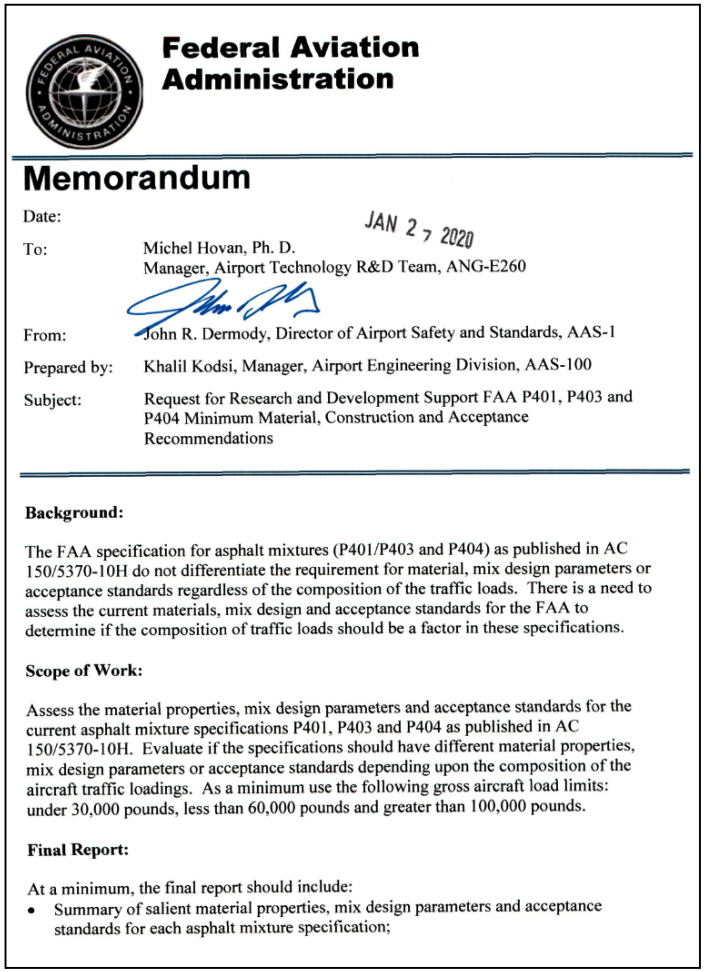
Scope of Work:

Investigate a limited number (at least two flexible) of runways in AK:

(1) The design requirements for flexible and rigid pavements considering seasonal frost and permafrost conditions;

Research Requests

7. Traffic Loads for Asphalt Pavement
Date: Jan 27, 2020



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Manager, Airport Technology R&D Team, ANG-E260

From: John R. Dermody, Director of Airport Safety and Standards, AAS-1

Prepared by: Khalil Kodsi, Manager, Airport Engineering Division, AAS-100

Subject: Request for Research and Development Support FAA P401, P403 and P404 Minimum Material, Construction and Acceptance Recommendations

Background:

The FAA specification for asphalt mixtures (P401/P403 and P404) as published in AC 150/5370-10H do not differentiate the requirement for material, mix design parameters or acceptance standards regardless of the composition of the traffic loads. There is a need to assess the current materials, mix design and acceptance standards for the FAA to determine if the composition of traffic loads should be a factor in these specifications.

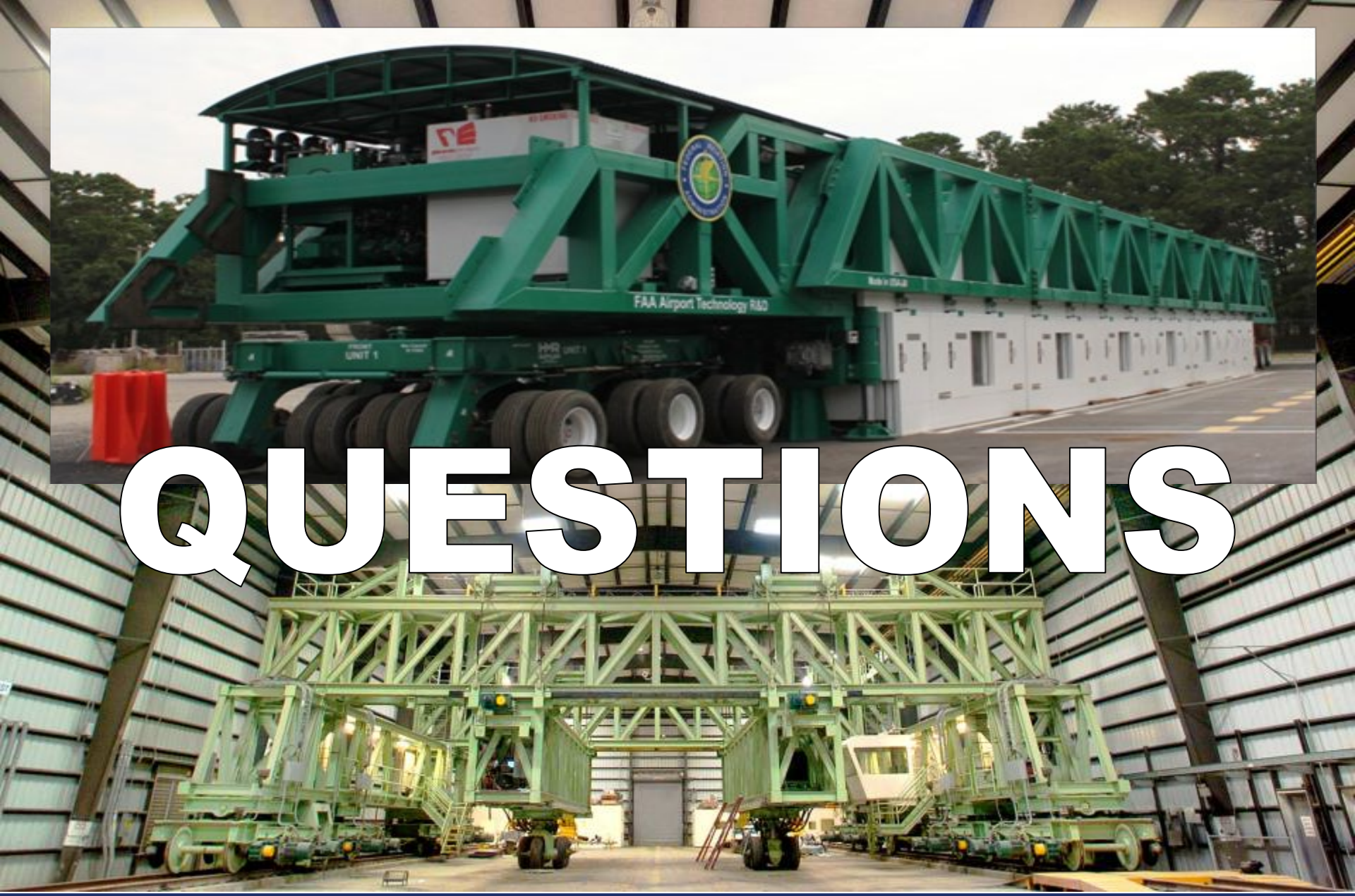
Scope of Work:

Assess the material properties, mix design parameters and acceptance standards for the current asphalt mixture specifications P401, P403 and P404 as published in AC 150/5370-10H. Evaluate if the specifications should have different material properties, mix design parameters or acceptance standards depending upon the composition of the aircraft traffic loadings. As a minimum use the following gross aircraft load limits: under 30,000 pounds, less than 60,000 pounds and greater than 100,000 pounds.

Final Report:

At a minimum, the final report should include:

- Summary of salient material properties, mix design parameters and acceptance standards for each asphalt mixture specification;



QUESTIONS